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Owikeno Lake (Rivers Inlet, Statistical Area 9) Fall Sockeye Salmon Escapement Survey 1988

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Survey 1988

by

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ABSTRACT

Winther, I., S.K. Bachen and R.D. Goruk. 1989. Owikeno Lake (Rivers Inlet, Statistical Area 9) fall sockeye salmon escapement survey 1988. Can. Data Rep. Fish. Aquat. Sci. 754. iii + 11 p.

Rivers Inlet sockeye salmon stocks spawn in the Owikeno lake system (Canada Department of Fisheries and Oceans, Statistical Area 9). Tributaries of Owikeno Lake are surveyed annually to enumerate sockeye escapement. In 1988 a total of 503,000 sockeye escaped to the Owikeno lake system. Seven representatives of the commercial fishing industry accompanied department staff during the industry tour. This report summarizes the 1988 fall enumeration survey and describes changes and enhancements to the system. Operation of the Genesee camp and required repairs are outlined.

RESUME

Winther, I., S.K. Bachen and R.D. Goruk. 1989. Owikeno Lake (Rivers Inlet, Statistical Area 9) fall sockeye salmon escapement survey 1988. Can. Data Rep. Fish. Aquat. Sci. 754. iii + 11 p.

Les saumons rouges qui reviennent de l'inlet Rivers frayent dans le réseau du lac Owikeno (zone statistique 9, Pêches et Oceans Canada). On fait chaque anée un releve des tributaires du lac Owikeno pour faire le dénombrement lors des echappees de saumons rouges. En 1988, 503,000 saumons rouges se sont dirigés vers le reseau du lac Owikeno. Sept représentants du secteur de la pèche commerciale ont accompagne les employes du Ministere lors des evaluations. Le present rapport donne un résumé des releves effectues a l'automne de 1988 et décrit les changements et les ameliorations apportés au réseau. Il décrit également le fonctionnement du camp Genesee et les réparations qui doi ent etre apportées.

INTRODUCTION

Owikeno Lake (Statistical Area 9) is the largest sockeye salmon (Onchorhynchus nerka) producing system in the Central Coast. Sockeye returns to Owikeno Lake support commercial fisheries held in the lower reaches of Rivers Inlet.

Sockeye salmon are enumerated in spawning streams of Owikeno Lake annually from September to October. Full descriptions of the watersheds have been documented by Thomson, Bachen & Goruk (1988).

METHODS

Machmell camp was first opened from June 14 to 25, 1988 for general repairs and maintenance identified in 1987 (Thomson, Bachen & Goruk, 1988). Buildings were cleaned and inventory taken. Asphalt roofing tiles were stripped from the large bunkhouse (Palace) and replaced with aluminum sheathing. Gas and oil barrels and diesel tanks were filled. A storage float was set up and the other floats were repaired. New stiff legs were attached to the log booms. Plumbing between the two floats was repaired.

The camp was reopened on September 2. Stream surveys were scheduled to begin September 6 but poor weather conditions kept remaining personnel in Prince Rupert. The program began September 8 when a second man arrived.

The systems were surveyed approximately every ten days, weather and water conditions permitting. The camp was closed October 23 after the Industry tour.

RESULTS

Weather and water levels taken at Machmell Camp, Owikeno Lake appear in Table 1. Escapements and targets for sockeye streams appear in Table 2. Systems are usually walked or boated to a regular site where the survey is terminated. These sites exist where obstacles prevent fish from continuing up the river or where crews cannot proceed. Table 3 documents the usual distance surveyed in each system and the distance surveyed in 1988. Table 4 lists the daily record of sockeye escapement surveys in 1988. Most of the streams exhibited low to fair escapements in 1988. Exceptions and enumeration difficulties are noted below.

GENESEE

For the second consecutive year, Genesee creek had a very poor escapement of only 500 sockeye. There was a very poor showing of fish at the mouth of the creek throughout the survey period. The incidence of bear predation was high.

INZIANA

A total of 20,000 sockeye spawned in the Inziana River from late August to mid October. Silty conditions prevailed through this period.

The Inziana break through to Owikeno Lake has caused the drying up of spawning beds in the lower portion of the river paralleling the lake (Fig. 1). Work to block off the breakthrough began in July when a bulldozer was barged to the Inziana from the Sheemahant logging camp. The barge was pulled with the Seatruck. A dike of gravel, logs and debris was built to block off the breakthrough. A channel was cut opposite the dike to divert water to the original river bed. A portion of the dike was washed out during the September floods. During these floods the river cut the channel opposite the dike deeper keeping the majority of the river away from the washed out portion of the dike. No loss of eggs is expected during low flows as in past years.

MACHMELL

The Machmell was only surveyed twice in 1988, once by helicopter and once by gillnet and seine net drifts during the industry tour. The system was very muddy and silty during both surveys. Normally the river is too channelized where it joins the Neechanz River for jet boat access. This season the river had cut one of the channels deep enough to allow access by jet boat but the steep gradient and the poor visibility allowed only the lower reaches to be surveyed.

During the industry tour the Machmell was drifted using a gillnet and a beach seine. A total of 29 sockeye (12 males and 17 females), 2 coho, 2 dolly varden and 2 carcasses were caught in 7 gillnet sets. Four sets using a small beach seine (100′ by 10′) produced 7 male and 3 female sockeye, 1 carcass, 1 jack coho and 1 cutthroat trout. The majority of the sockeye were new.

NEECHANZ

Sockeye escapement to the Neechanz River was excellent in 1988 with 53,000 fish returning. Counting conditions were excellent in September and late October. Fish were spawning in the system from late August to mid October.

SHEEMAHANT

The Sheemahant River had a good escapement of 200,000 sockeye. There was a good showing of redds in the lower river. Fish were sampled using a beach seine in the lower river and gillnets in the upper river below the cascades.

A fish lift was conducted on September 24 and 25, 1988 as part of an ongoing enhancement project to get fish to utilize spawning grounds above the cascades. Sixteen sets using a large beach seine (200' by 20') caught a total of 529 sockeye, 2 pink, 37 coho and 23 trout. 477 sockeye, 234 males and 243 females, were air lifted above the cascades. The second fish lift in early October was cancelled.

The majority of the sockeye lifted were from a large pool that starts approximately 200 meters below the logging bridge. Because of the short distance from this site to the release site, the helicopter had to wait occasionally while seine sets were made and sockeye loaded into the fish buckets. Waiting time increased as the pool was fished out. To increase the holding area for sockeye a pool should be excavated. It is assumed that this pool would be more desirable for sockeye to hold in than the natural pools in the river. Also, seining this pool would be much easier and efficient. The entrance could be blocked off to allow the sockeye holding in the pool to be caught and transported. The natural pool would still be fished once the holding pool was fished out. Helicopter waiting time would be reduced as more fish could be moved.

During the industry tour 7 gillnet drift sets were made above the logging bridge on the Sheemahant. Drift sets above the logging bridge normally are not conducted due to low water levels. This season the river had cut a suitable channel above the bridge deep enough to get jet boats further up the river. Gillnet drift sets were taken at various locations to confirm sockeye migrate to just below the cascades. A total of 32 male sockeye, 16 female sockeye, 1 coho, 1 dolly varden and 1 cutthroat trout were caught. Below the logging bridge 3 seine sets were made with the large net for 35 male sockeye, 28 female sockeye, 2 jack sockeye, 15 coho, 1 pink, 3 dolly varden and 2 cutthroat trout.

TZEO

The Tzeo was difficult to enumerate in 1988 because it didn't clear all season. Escapement was assumed to be average.

WANNOCK

Reasonable escapements of sockeye and chinook, 80,000 and 4000 (est.) respectively, were observed in the Wannock River. Sockeye began dropping back into the river from Owikeno Lake in early October. Four seine sets for sockeye were made above Smokehouse Island during the industry tour. Two of the sets snagged badly and only 6 male, 8 female and 6 jack sockeye were caught. In the other two sets 118 male, 546 female and 34 jack sockeye, 3 coho and 1 pink were caught. The sockeye were very large in size.

In 1988 the sockeye seine was used in the "spring hole" instead of the chinook seine. The dimensions of the seines are the same (200' by 20') but the chinook seine is made of 7" mesh and the sockeye seine is made of a much smaller (approximately 3") mesh with a heavier lead line. In years when the chinook seine was used most of the smaller fish would have escaped through the large meshes. Total catch for five sets was 31 male, 61 female and 8 jack sockeye, 18 adult and 15 jack coho, 27 chum, 6 pink and 49 chinook. Chinook from 10 to >70 pounds were caught and tagged for mark recapture studies. Of the 49 chinook tagged 29 were male and 20 were female. In the last two sets 3 chinook tagged in previous sets were caught again.

WASHWASH

Sockeye escapement to the Washwash was low in 1988 with only 35,000 total escapement. Sockeye were observed spawning from late August to the end of October but there was never a large body of fish in the river. Several chinook carcasses were counted in the system and coho were reported being caught by loggers sport fishing in mid October.

Stream improvement work was initiated on the Washwash during July. The upstream breakthrough was blocked off using a bulldozer and a backhoe. A dike of gravel over large boulders was built to block the breakthrough and divert water down the two main stems.

During the September floods the Washwash broke through to the Tzeo at the new dike again leaving very little water flowing down the two main stems (Fig. 1). A second

breakthrough developed during the floods approximately 500 m downstream from the original. The new breakthrough occurs at a bend in the Washwash only 30 m from the Tzeo.

When water levels permitted a new gravel dike was built on the existing dike to partially block off the upper breakthrough. During the flood approximately 2000 sockeye moved in to spawn in the breakthrough so a small gap was left to allow 30% of the water to flow down the breakthrough. Repairs could not be made to the lower breakthrough. By November the lower breakthrough had cut down approximately 2 m moving gravel from approximately 100 m upstream and drying up 400 m of spawning gravel downstream. Eggs from an estimated 7000 spawners were lost below the new breakthrough. A stabilization project has been proposed and permanent repairs are still being considered.

INDUSTRY TOUR

The industry tour occurred from October 11 to 21, 1988. All of the systems were surveyed despite poor weather and water conditions. Seven industry representatives and nine fisheries personnel attended:

Industry representatives:

Name	Representing	Dates attended October
Bonnie Brant	B.C. Packers	11-15
Dennis Brown	UFAWU (Newspaper)	11-14
Jim Cameron	UFAWU	11-22
Ian McKay	Pacific Gillnetters Assoc.	11-19
Jeff Meggs	UFAWU (Newspaper)	11-14
Dave Pashley	B.C. Packers, Bella Coola	11-15
Don Taylor	UFAWU	11-14

Fisheries representatives:

Name	Title	
S.K. Bachen	Technician	11-22
R.D. Goruk	Biologist	11-22
J. Greenlee	District 7 supervisor	17-22
B. Lunn	Fishery Officer	15-21
D.D. Radford	Biologist	17-22
I. Schutz	Technician	11-22
R. Senger	Fishery Officer	11-15
R. Wilson	Asst. District 7 supervisor	11-17
I. Winther	Biologist	11-22

In the future it would be beneficial to have all industry representatives and D.F.O. staff to stay for the duration of the tour.

Concerns raised by industry were: The amount of active logging in the Owikeno Lake drainage system leading to increases in runoff causing floods, silting, and slides. The seal population in the lake appears to be increasing. Seals were observed above the bridge in the Sheemahant River, above the coho pools in the Neechanz River and in the Machmell River. Seals were observed in the lake at the mouth of every system. The Wannock River has the largest population, with seals feeding on sockeye and chinook throughout the river. A herd of approximately 20 Stellar sea lions were observed at the mouth of the Wannock.

CAMP REPAIR REQUIREMENTS

The Genesee camp requires the following repairs.

The residence float has sunk below the level of the lash logs. If the lash logs rot and work loose the float will be destroyed. Fourteen logs have been secured at the camp as materials for additional flotation. In 1989 it is imperative that this wood be secured under the float.

The generator float has almost sunk. The lash logs have rotted and broke. The floor of the shed is at water level. A suitable float exists at the camp that can be used as a generator float. Materials are required to build a new shed on this float to house both generators. A metal shed should be constructed to comply with departmental safety regulations.

The shore fastenings require maintenance and the buildings need to be painted.

The Genesee camp was broken into sometime during the winter of 1987-1988 and all of the pots and pans were stolen. This was the first incidence of this sort at the camp. All of the buildings were locked except the generator shed. The incident was reported and filed with the R.C.M.P.

REFERENCES

Thomson, B.L., S.K. Bachen and R.D. Goruk. 1988. An historical overview of the Owikeno Lake (Rivers Inlet Statistical Area 9) fall sockeye salmon escapement surveys, 1971-1987. Can. Data Rep. Fish. Aquat. Sci. 711. iii + 69 p. + Appendices.

TABLE 1. Owikeno Lake 1988 daily weather and lake levels.

DATE	RIVER LEVEL (FT) AM	PM	WEATHER	
JUNE 14				PM-80% high overcast
JUNE 15	12.20	12.40	AM-broken cloud	PM-broken cloud
JUNE 16	12.90	13.20	AM-90% high overcast	PM-overcast, some rain
JUNE 17	13.20	13.30	AM-overcast, rain	PM-overcast, rain
JUNE 18	13.90	14.00	AM-90% overcast	PM-overcast
JUNE 19	14.00	13.75	AM-90% overcast	PM-30% overcast
JUNE 20	13.50	13.50	AM-scattered cloud	PM-clear
JUNE 21	13.20	13.00	AM-high overcast	PM-overcast, rain
JUNE 22	13.40	13.60	AM-overcast	PM-40% overcast, wind
JUNE 23	13.60	13.60	AM-90% overcast	PM-overcast, rain
JUNE 24	13.40	13.40	AM-clear	PM-high overcast
JUNE 25	13.10		AM-70% overcast	PM-high overcast
*				
SEPT 02		12.25	AM-	PM-sunny, hot
SEPT 03	12.20	12.25	AM-sunny, hot	PM-sunny, hot
SEPT 04	12.40	12.45	AM-sunny, hot	PM-sunny, hot, windy
SEPT 05	12.40		AM-sunny	PM-rain
SEPT 06	12.80	13.00	AM-rain	PM-rain
SEPT 07	13.80	13.80	AM-clear, sunny	PM-clear
SEPT 08	13.80	13.00	AM-high overcast, rain	PM-light rain
SEPT 09	12.80	12.00	AM-partly cloudy	PM-sunny
SEPT 10	11.80	11.50	AM-sunny, clear	PM-light NE wind
SEPT 11	11.30		AM-sunny, clear	PM-
SEPT 12	11.00	10.90	AM-clear, calm	PM-
SEPT 13	10.90		AM-clear, calm	PM-
SEPT 14	10.70	10.70	AM-heavy cloud	PM-
SEPT 15			AM-clear, windy	PM-
SEPT 16			AM-clear, calm	PM-
SEPT 17			AM-clear, calm	PM-
SEPT 18	9.85		AM-rain, SE 35-50	PM-rain, SE 45
SEPT 19	9.80		AM-sunny, NE 15-20	PM-sunny, calm
SEPT 20	9.60	9.50	AM-sunny	PM-partly cloudy
SEPT 21	9.40	9.30	AM-sunny, clear	PM-sunny
SEPT 22	9.20	9.15	AM-high overcast	PM-light rain
SEPT 23	9.15	9.00	AM-partly cloudy	PM-partly cloudy
SEPT 24	8.90	8.80	AM-clear	PM-clear
SEPT 25	8.70	8.60	AM-clear	PM-overcast
SEPT 26	8.55	8.55	AM-overcast	PM-light rain
SEPT 27	8.60	8.65	AM-light rain	PM-light rain
SEPT 28	9.45	13.05	AM-heavy rain	PM-heavy rain
SEPT 29	15.45	17.55	AM-rain	PM-some cloud
SEPT 30	17.25	16.65	AM-overcast	PM-scattered cloud
OCT 01	15.70	15.25	AM-clear, some fog	PM-clear, warm
OCT 02	14.55	14.10	AM-clear	PM-clear, warm
OCT 03	13.70	13.40	AM-clear	PM-clear, warm
OCT 04	13.10	13.05	AM-rain	PM-rain, fog
OCT 05	12.95	12.70	AM-thick fog	PM-clear, some fog
OCT 06	12.45	12.20	AM-high fog, calm	PM-clear, warm
OCT 07	11.90	11.65	AM-cloudy	PM-clear, warm
OCT 08	11.40	11.15	AM-clear, some fog	PM-clear, warm
OCT 09	10.90	10.75	AM-clear	PM-clear, warm
OCT 10	10.55	10.45	AM-clear, cool	PM-clear, warm
OCT 11	10.35	10.25	AM-clear, cool	PM-clouding over
OCT 12	10.30	10.50	AM-rain	PM-rain
OCT 13	11.10	11.70	AM-heavy rain	PM-rain
OCT 14	12.30	12.40	AM-some rain	PM-light rain
OCT 15	12.20	12.00	AM-overcast	PM-rain
OCT 16	12.00	11.80	AM-cloudy	PM-scattered cloud
OCT 17	11.50	11.30	AM-high overcast	PM-clear, cool
OCT 18	10.95	10.80	AM-overcast, rain	PM-rain
OCT 19	10.65	10.70	AM-overcast, rain	PM-rain
OCT 20	10.60	10.60	AM-overcast	PM-overcast
OCT 21	10.55	11.00	AM-heavy rain	PM-overcast, rain

* camp closed

** The measuring guage was moved in 1988 and is now .6' higher than 1987. Measurements in 1988 will appear .6' less than in 1987.
eg: 14.5' in 1987 is now 13.9'

Table 2: 1988 Escapements and target escapements for Owikeno Lake systems.

System	1988 Escapement	Target Escapement
AMBACK	40,000	100,000
ASHLULM	25,000	40,000
DALLERY	5,000	90,000
GENESEE	500	25,000
INZIANA	20,000	75,000
MACHMELL	30,000	50,000
NEECHANZ	53,000	50,000
OWIKENO LAKE SPAWNERS	5,000	30,000
SHEEMAHANT	200,000	200,000
TZEO	9,500	50,000
WANNOCK	80,000	200,000
WASHWASH	35,000	100,000
Total	503,000	1,010,000

Table 3: Distances to survey termination sites from the mouths of streams and distances surveyed during the 1988 industry tour.

System	Normal Distance Surveyed (km)	Distance surveyed during the 1988 tour (km)	Max. distance surveyed in 1988 (km)
AMBACK !	3.0	2.5	3.0
ASHLULM !	3.5	<1	3.5
DALLERY	3.8	3.8	3.8
GENESEE	1.3	1.3	1.3
INZIANA	1.6	1.6	1.6
MACHMELL	*	5.0 **	5.0
NEECHANZ	4.0	4.0	4.0
SHEEMAHANT	6.0	18.0 !!	18.0
TZEO	4.5	1.0	4.5
WASHWASH	2.5	2.5	2.5

* Machmell usually not surveyed
** Gillnet from 5 km to 2.5 km then seined below 2.5 km
! Survey distances preliminary - need to be measured in 1989
!! surveyed almost to cascades - usually only survey to bridge

TABLE 4: OWIKENO LAKE 1988- DAILY RECORD OF SOCKEYE ESCAPEMENT SURVEYS

DATE	STREAM	EST. NO. SOCKEYE			METHOD	WATER			COMMENTS
		LIVE	DEAD	%NEW		COND.	VIS.	LEVEL	
SEP 30	AMBACK	10000			HLCPTR	CLEAR	GOOD	NORMAL	FISH THROUGHOUT SYSTEM
OCT 05	AMBACK				HLCPTR	CLEAR	GOOD	NORMAL	FISH THROUGHOUT SYSTEM. 1 GRIZZLY
OCT 10	AMBACK	10000	500	80	WALK	CLEAR	EXLNT	NORMAL	4 GRIZZLIES
OCT 14	AMBACK	5000	480	80	WALK	TEA	GOOD	ABOVE NORM.	INDUSTRY TOUR. 20000 TTD. 40000 TFY
SEP 09	ASHLULM	4500	100	80	WALK	CLEAR	EXLNT	NORMAL	2500 LIVE, 50 DEAD PINK 70% NEW. 20 LIVE, 2 DEAD CHUM. 3 DEAD CHIN. 1 GRIZZLY
SEP 22	ASHLULM	3500	1000	75	WALK	CLEAR	EXLNT	ABOVE NORM.	1800 LIVE, 50 DEAD PINK 75% NEW. 2 LIVE, 10 DEAD CHUM. 1 DEAD CHIN
OCT 05	ASHLULM	6500			HLCPTR	CLEAR	EXLNT	NORMAL	4 GRIZZLY
OCT 19	ASHLULM				WALK		POOR	ABOVE NORM.	WATER LEVELS TOO HIGH TO WALK UP. POOR SHOWING AT BOTTOM. 25000 TFY
SEP 12	DALLERY	1500	10	90	WALK	CLEAR	EXLNT	NORMAL	3500 LIVE, 250 DEAD PINK 70% NEW. 4 GRIZZLY
SEP 23	DALLERY	1500	30	75	WALK	CLEAR	EXLNT	NORMAL	2500 LIVE, 100 DEAD PINK 40% NEW. 2 GRIZZLY
OCT 05	DALLERY	1500		100	HLCPTR	CLEAR	EXLNT	NORMAL	
OCT 20	DALLERY	800	103	80	WALK	TEA	GOOD	ABOVE NORM.	INDUSTRY TOUR. TFY 5000
SEP 15	GENESEE	50	5	100	WALK	CLEAR	EXLNT	NORMAL	1000 LIVE, 50 DEAD PINK 80% NEW. 1 GRIZZLY
SEP 28	GENESEE				WALK	MUDDY	NIL	ABOVE NORM.	RIVER VERY HIGH & MUDDY, GOOD SHOWING AT MOUTH
OCT 05	GENESEE	500			WALK	CLEAR	FAIR	BELOW NORM.	4 GRIZZLY
OCT 09	GENESEE	4-500			WALK	CLEAR	EXLNT	NORMAL	2 GRIZZLIES. TFY 500
AUG 18	INZIANA	2000	0	100	HLCPTR	SILT	FAIR	ABOVE NORM.	1000+ HOLDING OFF MOUTH. EXCLNT SHOWING IN 3RD LAKE
SEP 04	INZIANA	2000	100	60	WALK	SILT	FAIR	ABOVE NORM.	BREAK THROUGH PLUGGED. 25 BEAR KILLS IN LOWER SYSTEM
SEP 08	INZIANA	8000	200	50	HLCPTR	SILT	GOOD	NORMAL	
SEP 21	INZIANA	3000	1000	60	WALK	TEA	EXLNT	NORMAL	
SEP 27	INZIANA	3000	400	20	WALK	CLEAR	GOOD	NORMAL	
OCT 03	INZIANA	3000			JET BT	SILT	POOR	ABOVE NORM.	WATER BROKE THROUGH DIKE
OCT 05	INZIANA				HLCPTR	SILT	POOR	ABOVE NORM.	FISH PRESENT, VERY SILTY
OCT 08	INZIANA				WALK	SILT	POOR	NORMAL	INDUSTRY TOUR. SOCKEYE THROUGHOUT, VERY SILTY. TFY 20000
OCT 05	MACHMELL				HLCPTR	MUDDY	POOR	NORMAL	FISH PRESENT, VERY DIRTY. 2 GRIZZLY, LOTS OF EAGLES & GULLS
OCT 16	MACHMELL			100	GN DRFT	MUDDY	NIL	NORMAL	INDUSTRY TOUR. ALL GREEN FISH. TFY 30000
SEP 08	MARBLE	5-800			HLCPTR	CLEAR	FAIR	NORMAL	BELOW BRIDGE
AUG 18	NEECHANZ	600	0	100	HLCPTR	SILT	POOR	ABOVE NORM.	5 CHIN. REDDS
SEP 06	NEECHANZ	4500	6	60	JET BT	MUDDY	POOR	FLOOD	1 CHIN
SEP 08	NEECHANZ	6-7000		60	HLCPTR	SILT	FAIR	NORMAL	7 CHIN
SEP 14	NEECHANZ	7000		40	FLOAT	SILT	GOOD	NORMAL	5 COHO, 10 DEAD CHIN
SEP 23	NEECHANZ	15-20000			HLCPTR	CLEAR	EXLNT	BELOW NORM.	VERY GOOD VIS. GREEN FISH AT TOP, OLD FISH AT BOTTOM
OCT 05	NEECHANZ				HLCPTR	MUDDY	POOR	ABOVE NORM.	FISH THROUGHOUT, VERY DIRTY, 1000 AT MARBLE. 3 GRIZZLY
OCT 10	NEECHANZ			95	FLOAT	SILT	NIL	NORMAL	2 SN SETS FOR 103 SX, 1 COHO. FISH SMALL
OCT 15	NEECHANZ			80	SN	MUDDY	POOR	ABOVE NORM.	3 SN SETS FOR 28 M & 20 F SX, 5 COHO
OCT 16	NEECHANZ			85	GN	TURBID	FAIR	ABOVE NORM.	2 GN DRIFTS FOR 23 M & 8 F SX, 7 COHO
OCT 17	NEECHANZ	2500		90	SN	SILT	POOR	ABOVE NORM.	4 SN SETS FOR 58 M & 60 F SX, 12 COHO. TTD 50000. TFY 53000

TABLE 4 CONTINUED: OWIKENO LAKE 1988- DAILY RECORD OF SOCKEYE ESCAPEMENT SURVEYS

DATE	STREAM	EST. NO. SOCKEYE			METHOD	WATER			COMMENTS
		LIVE	DEAD	%NEW		COND.	VIS.	LEVEL	
SEP 08	SHEEMAHANT				HLCPTR	SILT	POOR	NORMAL	GOOD SIGN OF REDDS, FEW FISH SHOWING
SEP 11	SHEEMAHANT			85	SN	SILT	POOR	NORMAL	VERY GOOD SHOWING THROUGHOUT, 6 SN SETS FOR 209 SX, 3 PK, 4 COHO
SEP 19	SHEEMAHANT				GN	SILT	FAIR	NORMAL	4 GN SETS FOR 43 SX, 3 COHO
SEP 24	SHEEMAHANT			80	HLCPTR	SILT	GOOD	BELOW NORM.	FISH LIFT: 8 SN SETS FOR 360 SX, 2 PK, 20 COHO.
SEP 25	SHEEMAHANT			80	HLCPTR	SILT	GOOD	BELOW NORM.	FISH LIFT: 9 SN SETS FOR 169 SX, 17 COHO.
OCT 05	SHEEMAHANT				HLCPTR	MUDDY	POOR	ABOVE NORM.	FISH THROUGHOUT, VERY DIRTY
OCT 13	SHEEMAHANT			100	GN & SN	SILT	POOR	ABOVE NORM.	INDUSTRY TOUR. 7GN & 3SN SETS FOR 112 SX. TFY 200000
AUG 08	TZEO	3000		60	HLCPTR	SILT	POOR	NORMAL	
OCT 05	TZEO				HLCPTR	MUDDY	POOR	ABOVE NORM.	RIVER DIRTY, FISH ABOVE JAM & BOTTOM OF RIVER
OCT 08	TZEO				JET BT	SILT	POOR	NORMAL	GOOD SHOWING. TFY 9500
SEP 04	SHMHT FLATS	0			JET BT	SILT	FAIR	ABOVE NORM.	
SEP 11	SHMHT FLATS	0			JET BT	SILT	FAIR	NORMAL	
SEP 21	SHMHT FLATS	100		100	JET BT	TEA	FAIR	NORMAL	
SEP 27	SHMHT FLATS	300		80	FLOAT	SILT	FAIR	NORMAL	VERY GOOD SHOWING. TFY 5000 OWIKENO LAKE SPAWNERS
OCT 04	WANNOCK				JET BT				FISH STARTED TO SHOW SEP 27.
OCT 18	WANNOCK				SN	SILT	POOR	ABOVE NORM.	INDUSTRY TOUR. 2 SN SETS FOR 664 SX. TFY 80000. TAGGED 47 CHIN
SEP 04	WASHWASH	10			JET BT				FISH IN LOWER RIVER. NONE IN ESTUARY OR JUMPING IN LAKE
SEP 08	WASHWASH	400			HLCPTR	CLEAR	FAIR	NORMAL	2 GRIZZLY
SEP 13	WASHWASH	4000	200	75	WALK	CLEAR	EXLNT	NORMAL	500 LIVE, 50 DEAD PINK 45% NEW
SEP 21	WASHWASH	4000	300	85	WALK	CLEAR	EXLNT	NORMAL	1 GRIZZLY CARCASS, 4 HUNTERS
SEP 27	WASHWASH								VERY LARGE SCHOOLS HOLDING OFF THE MOUTH
OCT 03	WASHWASH	13000	800	75	WALK	CLEAR	EXLNT	BELOW NORM.	BREAKTHROUGH AROUND RIPRAP AND NEW BREAKTHROUGH
OCT 05	WASHWASH				HLCPTR	CLEAR	GOOD	NORMAL	BLOCKED PART OF BREAKTHROUGH. 2000 IN BREAKTHROUGH
OCT 08	WASHWASH	10500	LOTS	60	WALK	CLEAR	EXLNT	NORMAL	PLUGGED UP BREAKTHROUGH
OCT 12	WASHWASH	10000	2000		WALK	TEA	GOOD	ABOVE NORM.	INDUSTRY TOUR. TTD 30000, TFY 35000
SEP 04	SUNDAY/WISK	50		50	JET BT	SILT	FAIR	ABOVE NORM.	NO FISH IN WISKEY
SEP 11	SUNDAY/WISK	100		50	JET BT	SILT	FAIR	NORMAL	WISKEY 25, SUNDAY 75
SEP 21	SUNDAY/WISK	70		100	JET BT				
SEP 27	SUNDAY/WISK	275		90	JET BT	TEA	GOOD	NORMAL	SUNDAY 75, WISKEY 200
OCT 03	SUNDAY/WISK	200			JET BT	SILT	FAIR	NORMAL	WISKEY 50, SUNDAY 150
SEP 04	3RD NARROWS	150		75	JET BT	SILT	FAIR	NORMAL	FISH ALONG BEACH
SEP 11	3RD NARROWS	150			JET BT	SILT	GOOD	NORMAL	
SEP 21	3RD NARROWS	50		80	JET BT				1 COHO, 50 PINK, 50% NEW
SEP 27	3RD NARROWS	300		90	FLOAT	MILKY	FAIR	NORMAL	
OCT 03	3RD NARROWS	500		80	JET BT	SILT	FAIR	NORMAL	
OCT 08	3RD NARROWS	500			BOAT	MUDDY	POOR	ABOVE NORM.	WATER VERY DIRTY

ABBREVIATIONS: BT = BOAT, CHIN = CHINOOK, COND = CONDITION, DRFT = DRIFT, EXLNT = EXCELLENT, F = FEMALE, GN = GILLNET, HLCPTR = HELICOPTER, M = MALE, NORM = NORMAL, PK = PINK, SHMHT = SHEEMAHANT, SN = BEACH SEINE, SX = SOCKEYE, TFY = TOTAL FOR YEAR, TTD = TOTAL TO DATE, VIS = VISIBILITY, WISK = WHISKEY

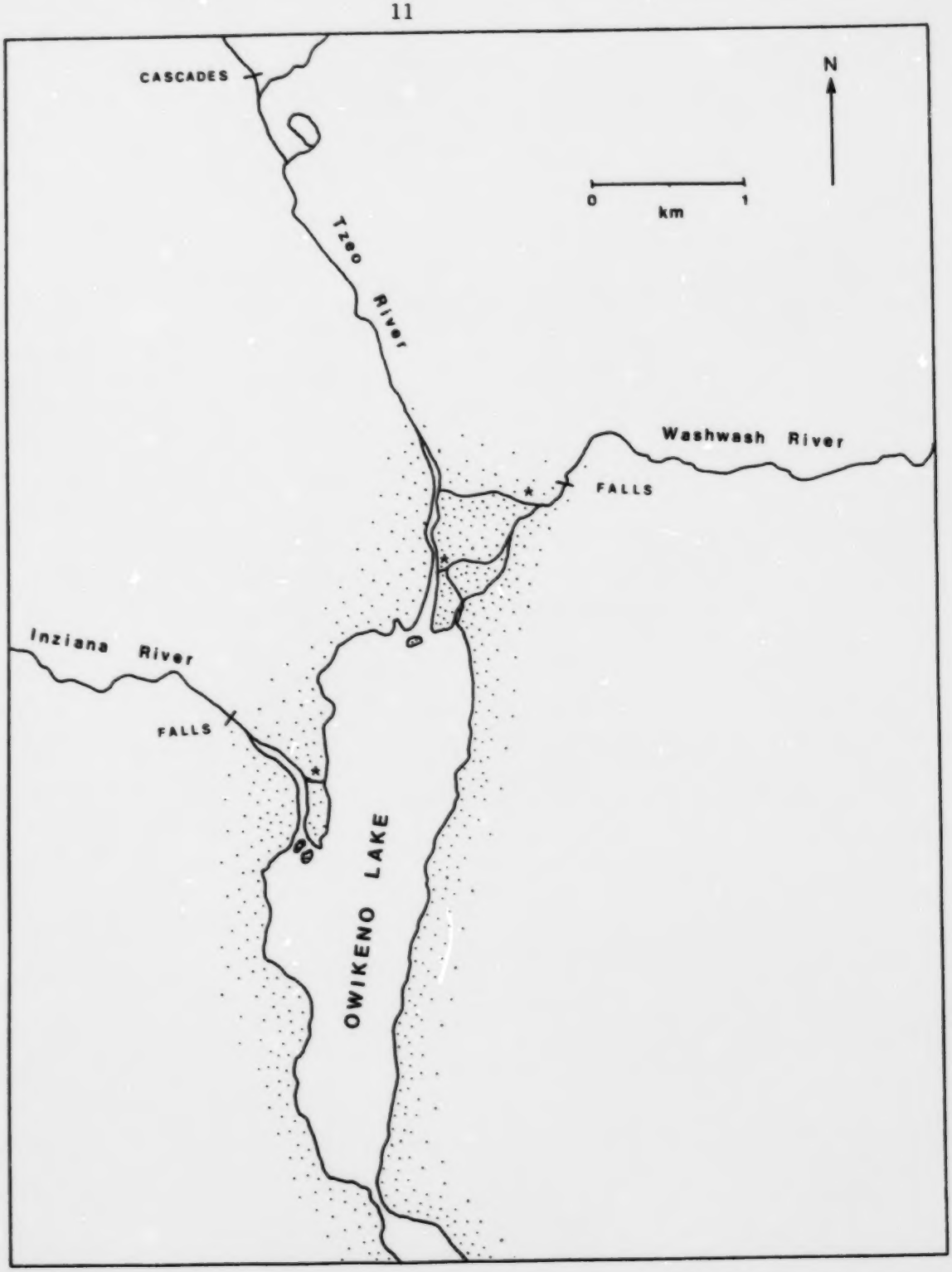

Figure 1: Northern Owikeno Lake watersheds detailing Inziana and Washwash breakthroughs. Breakthroughs are marked with an *.